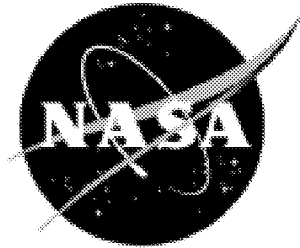


NASA/CR-2002-211643



Investigation Into The Needs Of Part 135 Operators To Access Airports Restricted Under FAR 135 Sections 135.213, 135.219, and/or 135.225

Clifford A. Eckert
Georgia Tech Research Institute, Atlanta, Georgia

April 2002

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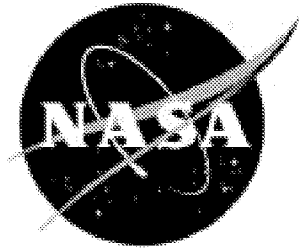
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ABSTRACT

NASA and the FAA have joint interests and responsibilities for developing guidelines and standards for cockpit displays of Flight Information Services (FIS) information, and for developing enhancements to planned FAA FIS Data Link (FISDL) services. NASA and the FAA have established responsibilities in connection with development tasks for enhancements to the FISDL project. This report is the result of NASA Task 2, “Weather Support Concept—Part 135 Operations.” The objective of the task was to determine the needs of Part 135 operators as they relate to FAA Part 135 Sections 135.213, 135.219 and 135.225, which pertain to weather reporting requirements at destination airports. This report discusses the results of two questionnaires completed by volunteer Part 135 operators that questioned their operations, their needs for flying to airports without weather reporting capabilities and suggestions for modifying FARs 135.213, 135.219 and 135.225. The operators pointed out airports in areas of the CONUS that were needed for IFR operations but lacked weather-reporting capabilities, and they offered practical suggestions for changes to the FARs. Related to operators’ needs, and discussed in this report, were the fractional ownership NPRM and the possible impact of GPS, WAAS and LAAS approaches.

FINAL REPORT

INVESTIGATION INTO THE NEEDS OF PART 135 OPERATORS TO ACCESS AIRPORTS RESTRICTED UNDER FAR 135 SECTIONS 135.213, 135.219, AND /OR 135.225

1.0 Introduction

This report is prepared for NASA Langley Research Center under Task Order 1013, which supports the FAA FIS Data Link (FISDL) services effort. NASA and the FAA have joint interests and responsibilities for developing guidelines and standards for FISDL and have developed an Interagency Agreement (IA) to facilitate enhancement tasks. This report is the culmination of task RDE.1130 that is associated with Task 2, “FIS Weather Support Concept-Part 135 Operations” in the IA statement of work.

The objective of the Task Order 1013 was to determine the Part 135 operators’ need for filing (IFR) to destinations that do not have and are not scheduled to have official weather reporting capabilities. To accomplish this task GTRI surveyed a representative cross section of Part 135 operators. Two questionnaires were sent and returned via email that allowed operators to respond to questions about their operation and provide input on the airports that are needed but do not have weather reporting capabilities. The task also required research into airports that were requested by 135 operators but do not have local weather reporting capabilities and are not scheduled to have automated weather reporting systems installed. Finally, the task required a study of those airports that could receive GPS approaches with WAAS/LAAS (with no local weather reporting) and thus could become available destinations for Part 135 operators.

This report provides the results of the above tasks. It will focus on the Part 135 operators that have the most “need” to access airports without weather reporting capabilities and will discuss the results of the operator survey. It will discuss current Part 135 regulations and the current Notice of Proposed Rulemaking (NPRM) that will, if incorporated, affect Part 135 operators’ ability to file IFR to destination airports. This report will analyze and graphically depict the status of airport weather reporting capabilities across the lower 48 states and Alaska. It will analyze GPS instrument approaches and the possible impact on Part 135 operators. Finally, this report will draw conclusions and make recommendations on ways to increase airport accessibility for Part 135 operators.

2.0 Background

In order to understand the needs of the Part 135 operators from a weather reporting perspective, it is necessary to understand the types of Part 135 operators, the regulations each type of Part 135 are required to comply with, and the landing facility services (weather information and instrument approaches) used by each operator.

2.1 Categories of Part 135 Operators

FAA Part 135 regulations define the operating requirements for “commuter” and “on-demand” operations. Commuter operations, often called scheduled passenger operations, are any scheduled airplane or rotorcraft operations with a frequency of operations of at least five round trips per week on at least one route between two or more points according to a published flight schedule. The aircraft cannot be turbojet powered and cannot have more the 9 passenger seats or a maximum payload exceeding 7,500 pounds. On-demand operations consist of passenger-carrying “common carriage” and “noncommon carriage” operations in which the departure time, departure location, and arrival location are specifically negotiated with the customer. On-demand “common carriage operations” are conducted using aircraft, including turbojets, having 30 seats or less and a payload capacity of 7,500 pounds or less. “Noncommom carriage” operations are conducted with airplanes, included turbojets, with less than 20 seats and a payload capacity of less than 6,000 pounds. All rotorcraft on-demand operations are conducted under Part 135 regulations. These regulations basically break Part 135 operations down into the following categories of operations:

- Scheduled commuter airline operations with aircraft that have 9 or less passenger seats
- EMS helicopter and fixed wing operations
- On-demand charter operations – helicopter and fixed wing

This research project was focused primarily toward on-demand operators. EMS helicopter operators were contacted and questioned, however, because EMS helicopter operators have unique landing facility requirements and, under certain conditions, are eligible to be exempted (Exemption 61-75) from Part 135.225 requirements, thus are not specifically addressed. Also, due to the very small number of scheduled commuter airline operations, this category of Part135 operator was not researched.

2.2 Regulations

Part 135 operators must comply with FAR Part 135.213, 135.219, and 135.225 for filing IFR (Instrument Flight Rules) to destination airports. (See Appendix A – Part 135 Regulations). There are several provisions in the regulations that need clarification in order to determine the impact, if any, on Part 135 operators. Sections 135.213 and 135.225 refer to a [weather] source approved

by the U.S. National Weather Service (NWS) or a source approved by the Administrator. The FAR's do not specify what "other sources" would be approved by NWS or the Administrator. For a clarification on what "other sources" would be approved, an FAA attorney was contacted. The attorney referred GTRI to the Air Carrier Inspector Handbook, Volume III, 8400.10. According to Section 3, Subsection 1439 ("Sources of NWS Weather Reports or Sources Approved by NWS") the sources of NWS weather reports or sources approved by NWS are as follows:

- NWS offices (including contract observatories)
- Flight Service Stations
- Supplemental aviation weather reporting stations (SAWRS) (These facilities are usually operated by an aeronautical enterprise for a local government under an agreement with NWS.)
- Limited aviation weather reporting stations (LAWRS) (These are observations taken by airport traffic control towers.)
- Automated surface observations – ASOS and AWOS. These systems may be approved as a source of meteorological data when they meet FAA/NWS technical standards. Some automated systems cannot report all items required for a surface aviation weather report.

Further, Subsection 1441 of the handbook lists the sources of weather approved, or found satisfactory by the FAA, which may be used by Part 121 and Part 135 operators.

- Any source listed in Paragraph 1439
- Any active meteorological office operated by a foreign state, which subscribes to the standards and practices of ICAO conventions.
- Any U.S. or NATO military weather reporting sources (Use of these sources is limited to control of those flight operations which use military airports as departure, destination, alternate, or diversionary airports.)

The NWS did not provide any written guidelines for the "other sources" that would be approved by the NWS. They indicated that aviation weather information comes from three primary sources, ASOS, AWOS, and manual observation by trained individuals. According the NWS, approximately 90% of ground surface weather is derived either directly or indirectly from ASOS and AWOS. Currently, the NWS's main role is in quality control and inspection of weather reporting. Within the next year NWS will no long be providing SA surface weather information and will be out of the aviation weather observing business.¹

The Air Carrier Inspector Handbook specifies what weather information is required to be provided for Part 135 operations. According to Paragraph 1437, when a Part 121 and Part 135 operator is required to use a weather report, the report must contain at least the following meteorological information.

¹ Victor Murphy, National Weather Service, Southern Region Aviation Meteorologist

- Time of observation
- Visibility
- Altimeter setting
- Temperature
- Dew point
- Wind speed
- Wind direction
- Cloud height (required only when ceiling is specified as part of a landing or takeoff minimum)

While Part 135 operators are required to use approved weather sources for filing IFR to destination airports, Part 135 operators are not required to file IFR if conditions allow VFR flight. This situation is addressed in both the FARs and the Air Carrier Inspector Handbook. According to the handbook, if NWS or other approved reports are not available for VFR operations, a pilot in command (PIC) may use weather information based on his own observations or on those of other competent persons. For this purpose, the FAA considers certificated commercial pilots, airline transport pilots, dispatchers, air traffic controllers, and trained weather observers competent to provide weather information for Part 135 VFR operations. Some Part 135 operators do not fly any IFR operations such as air medical helicopter operations and tourist charter operations in Alaska. Other operators do not fly any VFR operations such as the larger charter operations with jet fleets. The needs assessment survey received input from VFR only, IFR only and both IFR and VFR operators.

2.3 Landing Facility Services

2.3.1 *Automated Weather Reporting Services*

Automated weather observation stations play a vital role in providing surface weather information to pilots. Automated Surface Observing System (ASOS) and Automated Weather Observing System (AWOS) are the two systems currently used at airports. A third automated weather system, Automated Weather Sensor System (AWSS), will be installed starting in 2002. (See Table 1 below.) AWSS is a surface weather observing system similar to AWOS and ASOS, and will provide pilots and other users with all the weather information furnished by ASOS systems using the latest technology. The first system will be installed for operational testing at Bloomington, IL (BMI) in 2002, and the first 15 systems are planned to be operational by April 2004.² Figures 1 and 2 show the coverage of ASOS and AWOS stations.

² Bob Beatty, FAA AUA-430

Table 1- AWSS Future Installation Locations

1. Bloomington, IL. (BMI)
2. OKC - Second Level Engineering/
3. OKC - Classroom Systems
4. Smyrna, TN. (MQY)
5. Newburgh, NY. (SWF)
6. Owensboro, KY. (OWB)
7. Nashua, NH. (ASH)
8. Ithaca, NY. (ITH)
9. Bozeman Pass, MT. (QEZ)
10. Lanai, HI. (LNY)
11. Atqasuk, AK. (ATK)
12. Hailey, ID. (SUN)
13. Beaver Falls, PA. (BVI)
14. Lakeland, FL. (LAL)
15. Laredo, TX. (LRD)

Figure 1 - Automated Weather Stations - CONUS

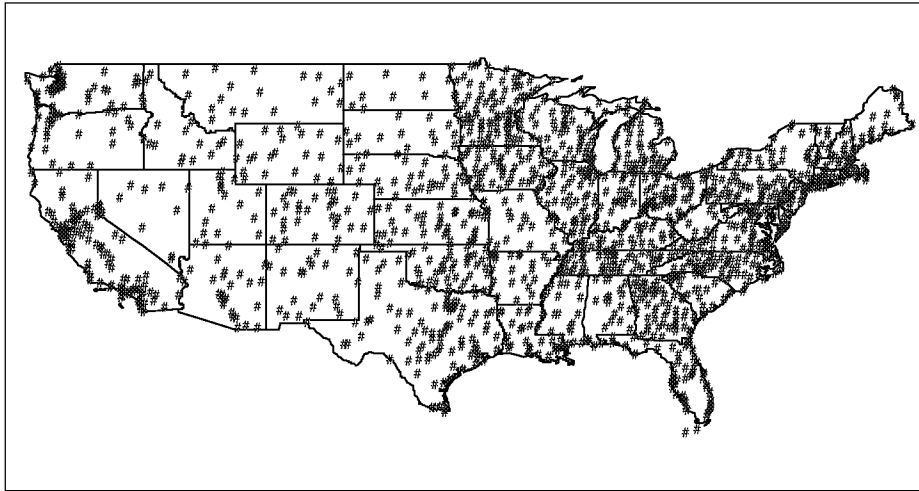
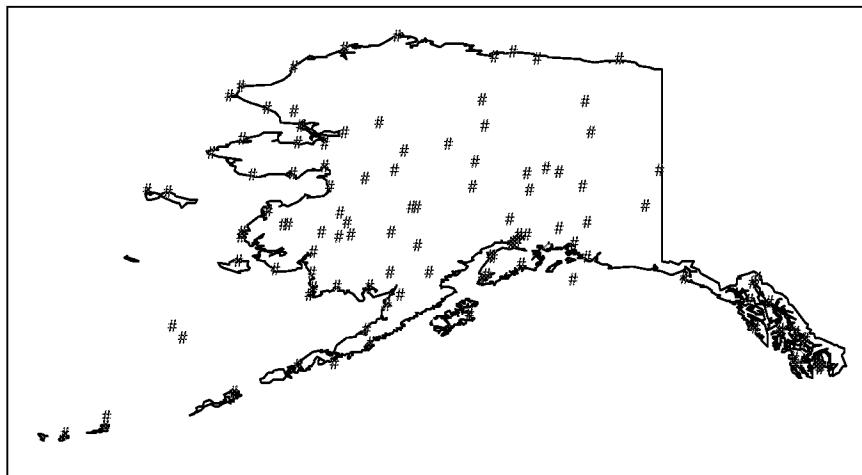


Figure 2 - Automated Weather Stations – Alaska



There are approximately 1475 stations in the CONUS and 112 stations in Alaska most of which are located on airports. This represents approximately 8% of all 19,687 landing facilities listed in FAA's Landing Facilities Database, 30% of all public airports, and 49% of NPIAS (National Plan of Integrated Airport Systems) airports. AWOS stations are categorized by sensing capabilities as follows:

- AWOS I: Wind Speed, Wind Gust, Wind Direction, Variable Wind Direction, Temperature, Dew Point, Altimeter Setting, Density Altitude
- AWOS II: Same as AWOS I + Visibility, and Variable Visibility
- AWOS III: Same as AWOS II + Sky Condition, Cloud Height and Type
- AWOS III-P: Same as AWOS III + Present Weather, Precipitation Identification
- AWOS III-T: Same as AWOS III + Thunderstorm and Lightning Detection
- AWOS III-P-T: Same as AWOS III + Present Weather and Lightning Detection

Not all AWOS stations qualify as "official weather reporting stations". AWOS-1 stations certified under AC91-54 and operated as independent, single-source reporting systems, do not satisfy the requirements of Part 135. This type of system is approvable only as a source of basic data for a SAWRS.

Several departments within the FAA and NWS were contacted for current information on ASOS and AWOS locations. FAA agencies ARS-20 and AVN-502, and the NWS all provided a database of ASOS and AWOS locations. The three databases were compared with each other and discrepancies were found between all three databases as to the existence, type and location of the automated weather station. Because of these discrepancies all the numbers quoted in this report

related to ASOS and AWOS stations are subject to correction and should be considered approximate numbers.

Automated weather reporting stations provide more than 90% of weather observation information for the aviation community. Most weather information either originates from automated weather stations, or compliments other weather reporting information, such as with Flight Service Stations (FSS), NWS offices, SAWRS and LAWRS. For this reason, the analyses performed in this report assume that a landing facility's weather reporting capability is based on whether the landing facility has an ASOS or AWOS (any level) station.

2.3.2 Instrument Approaches – LAAS/WAAS

FAA's Wide Area Augmentation System (WAAS) and Local Area Augmentation System (LAAS) are still in the development and test stage. WAAS will be implemented in stages beginning in 2002/2003. Current plans call for a phased delivery of WAAS, both from a system capability perspective and approach publication. At commissioning, WAAS is expected to support approaches with vertical guidance down to minimums ranging from as low as 250 feet (optimum terrain) to approximately 350 feet and about 1-mile visibility (unusual obstacles could require higher minimums.) This capability will exist with at least 95 percent availability over about 50 percent of the lower 48 states. Congress has only approved funding for phase 1 of the program. Under phase 1, the WAAS satellite footprint primarily covers the central portion of the US. Therefore, other areas of the country will experience non-availability of WAAS minimums due to poor satellite geometry. For example, non-availability will be greater than 20% of the time for most all of Oregon and northern Idaho. The best availability in Oregon occurs in the extreme southeastern portion of the state where unavailability should be between 10% and 15% of the time. The best availability in Idaho should occur in the southeastern portion of the State with unavailability ranging from 2.5% and 5% of the time.³ LAAS approaches, when initially implemented, will be used primarily at high demand airports where weather reporting currently exists therefore will not play a role in impacting Part 135 operators.

Because WAAS is a satellite based augmentation system all US airports are, or eventually will be, within WAAS satellite coverage. Constraints exist, however, that may not allow some airports to incorporate WAAS approaches. New GPS WAAS precision and non-precision approaches are being planned for airports that offer lower visibility and height above touchdown (HAT) minimums. One challenge for airports is that there will be a new category of non-precision approach with vertical guidance called NPV. This category of approach includes requirements for 14 CFR Part 77 precision runway designation. The application of this standard, combined with the required higher airport design standards, may be very significant. For example, if an airport currently has a nonprecision approach with the typical minimums of 600 – 1, but would like to plan for a NPV approach with minimums of 300 – ¾, the standard Runway Protection Zone (RPZ) will increase in size 3 /12 times – from approximately 14 acres, to approximately 49 acres.

³ <http://www.raytheon.com/waas/QA.html>

A CAT 1 (200 – 1/2) RPZ measures almost 79 acres. FAA requires airports to control development and land use in RPZs -owning them outright whenever possible.⁴ Other new implementation issues such as runway length, runway and approach lighting, taxiway availability, and obstruction clearance will all be factors in determining whether an airport can incorporate a GPS WAAS approach. There are also issues regarding controlled airspace. Public instrument procedures, for the most part, must be contained in controlled airspace. If the airspace surrounding the airport is uncontrolled (Class G), or if insufficient controlled airspace is present, it will be converted by the FAA to controlled airspace (usually Class E) prior to publication of the procedure. This is a lengthy process, as it requires the procedure to be developed first, so that the limits of the required airspace can be determined. Then, legal notice of the airspace change must be published in the Federal Register with a public comment period.⁵ Finally, the development of GPS WAAS approaches will be prioritized based on safety (emergency medical operations or simplifying existing procedures), activity levels, and capacity problems.

In summary GPS WAAS technology will eventually provide a means for many airports to provide instrument approaches for Part 135 operators. The question is - can the airports needed by Part 135 operators, construct and afford the necessary changes and upgrades that are going to be required for the new approaches? Because of the uncertainty of an airport's ability to benefit from future WAAS/LAAS approaches, and because of the lengthy timeframe of possible WAAS LAAS implementation at many airports, WAAS/LAAS will not be a factor in this analysis for determining available destinations for Part 135 operators. For analysis purposes, however, the airport must be able to meet the minimum runway length criteria for a non-precision instrument approach.

2.4 NPRM

The FAA is proposing to update and revise the regulations governing the operations of aircraft in fractional ownership programs.⁶ Provisions of the notice of proposed rulemaking (NPRM) would define fractional ownership programs and their various participants, assign responsibilities and authorities for safety and ensure that the fractional ownership plan maintains a high level of safety. Changes are also proposed to regulations pertaining to on-demand operators. Of interest to this needs assessment study, are the changes to Part 135 Section 135.225. Section 135.225(a) prohibits an air carrier from initiating an instrument approach at a destination airport unless that airport has a weather reporting facility on the field. Part 91 operations do not have this restriction. The National Air Transportation Association, on behalf of on-demand Part 135 operators, has asked for relief from this requirement through limited exemptions. The Fractional Ownership Aviation Rulemaking Committee (FOARC) concluded that an equivalent level of

⁴ http://docs.vircomnet.com/mobility/Ais_vc/GPS.html

⁵ Victor J. Zembruski, SEA FPO <http://www.nw.faa.gov/airports/Planning/gpsprocedures.doc>

⁶ Docket No. FAA-2001-10047, Regulation of Fractional Aircraft Ownership Programs and On-Demand Operations

safety could be maintained by permitting an alternative means of compliance with the destination airport weather reporting facility requirements. The alternative recommended by FOARC, requires that if the destination airport does not have weather reporting, then an alternate airport must be selected that does have weather reporting. Both the destination and the alternate airport, if required, must have a current local altimeter setting or a current alternate altimeter setting provided by the facility designated on the approach chart for that airport. The FAA is proposing the changes that FOARC recommended and, to ensure an equivalent level of safety, the FAA has added to the requirement that only “eligible on-demand operators,” as defined in proposed Section 135.1(b) be permitted to use an alternate means of compliance. “Eligible on-demand operators” means an on-demand operator that meets the flight crew experience, pilot limitations and pairing requirements of Sections 91.1053 and 91.1055.

This NPRM is controversial because it proposes changes to management requirements, pilot requirements, overwater operations, and runway length requirements in addition to the Part 135 changes discussed above. There are many that oppose changes to regulations suggested by the NPRM. The NTSB submitted comments urging the FAA to reexamine the parts of the NPRM that would relax the requirements for Part 135 operations and to consider whether they should be studied separately.⁷ The NPRM status is “pending” of this report date.

Operators were asked in the needs assessment survey to comment on how the proposed regulation changes would impact their operations in the first and second questionnaire. Their responses varied from “no impact since we only fly VFR” to “...safer than shooting approach to approved weather airport, getting below ceiling and scud running to intended airport destination.” It appears that the operators that could benefit the most from the proposed regulation changes are the smaller (single, twin and turboprop aircraft) eligible on-demand and EMS operators that need to file IFR into airports that do not have weather reporting capabilities. It was also evident in the survey responses that an alternative means of compliance with Part 135.225 is definitely needed.

3.0 Operator Survey

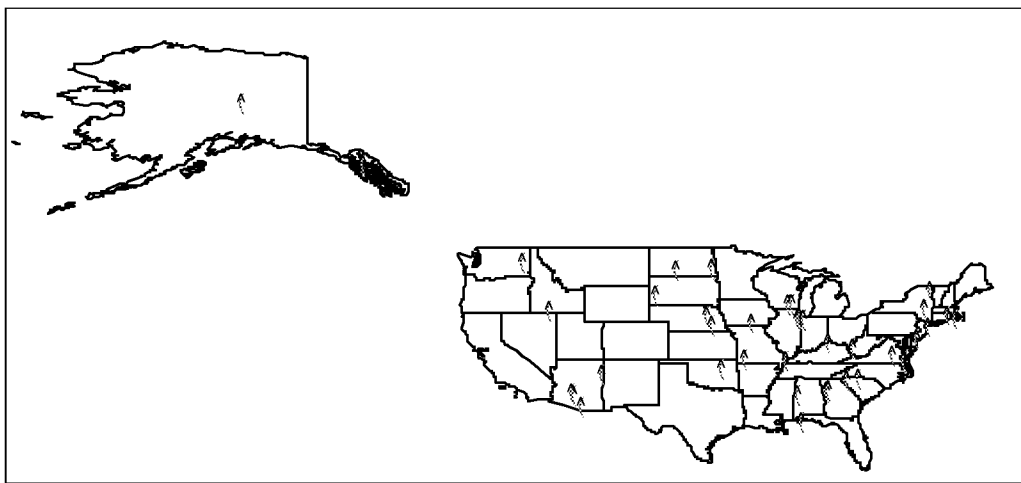
GTRI initiated the Part 135 operator survey by calling 147 Part 135 operators to see if they were interested in participating in the survey. The list of potential participants came from the National Air Transport Association (NATA) membership database, from the Helicopters Association International (HAI) database, and from the Association of Air Medical Services (AAMS) database. Operators were chosen from each FAA district to ensure a representative cross section of operators. Other criteria objectives for each FAA district were to find single engine through jet equipment operators and air ambulance helicopter operators. Of the 147 operators solicited, 79 were willing to participate in the survey. This number of survey participants represents a very small percentage of the total Part 135 industry. The 79 operators that volunteered for the survey represent less than 8% of NATA membership. The survey was conducted using two

⁷ Letter to the FAA from National Transportation Safety Board, dated January 11, 2002

questionnaires. The questionnaires were sent to each participating operator via email and operators were asked to have the responses returned either by email or fax. They were given about one week to complete and return each questionnaire.

The first questionnaire (Appendix C) asked the operators questions about their operation, flight profiles, possible impact of NPRM FAA-2001-10047, and opinions or suggestions related to FARs Part 135.213, 135.219, and 135.225. Of the 79 questionnaires emailed out, 39 were returned. Figure 3 shows the locations of the operators that responded. The responses varied from effortless generalizations to detailed information.

Figure 3 - Operators Responding to Survey



The second questionnaire asked follow-up questions based on comments from the first questionnaire. The topics were primarily related to weather requirements at destination airports. Of the 79 questionnaires emailed to participants, 21 were returned. As with the first questionnaire, the responses varied from one or two comments to a lengthy narrative.

GTTRI analyzed the survey by breaking down the information into 3 “operator need” categories:

- How many airports?
- Which airports?
- FAR suggestions and comments?

Of the 39 responses to the first questionnaire, most responded to the questions about the frequency of non-weather airport use and frequency of non-weather airport need. Based on the information provided by the operators, a little more than 90% of their monthly flights are to airports that have weather reporting capabilities, meaning that fewer than 10% of the flights are to airports without weather reporting. When analyzed by the type of operations, it is clear that EMS operations require VFR flights more often. In many cases, EMS operations are VFR only. Approximately 25% of monthly medical trips were to non-weather reporting airports. Approximately 7% of charter cargo flights were to non-weather airports.

The operators provided information on how many trips per month were turned down due to lack of weather reporting at destination airports. Based on their information approximately 165 trips per month were declined due to lack of weather reporting. This number represents about 2% of all the flights flown by the operators in the survey.

Operators were asked to provide a list of needed airports that had instrument approaches but no weather, and a list of airports that had neither instrument approaches nor weather reporting capabilities. Twelve operators provided a list of 36 needed airports that did not have an instrument approach or weather reporting capabilities. Eighteen operators provided a list of 55 airports that had instrument approaches but did not have weather reporting. Figures 4 and 5 depict the locations of the requested airports and their relation to all the participating operators for the CONUS and Alaska.

Figure 4 - Participating Operators Requested Airports – CONUS

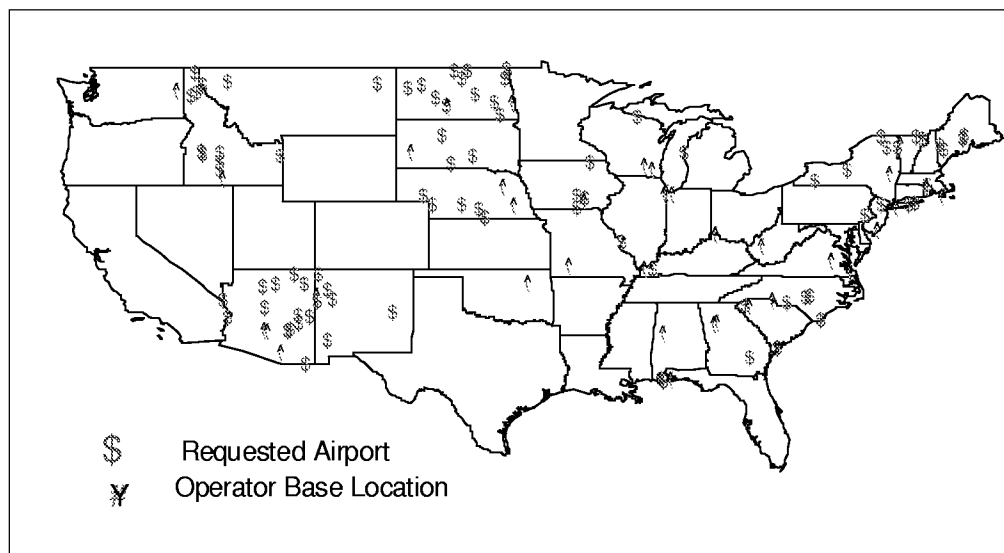
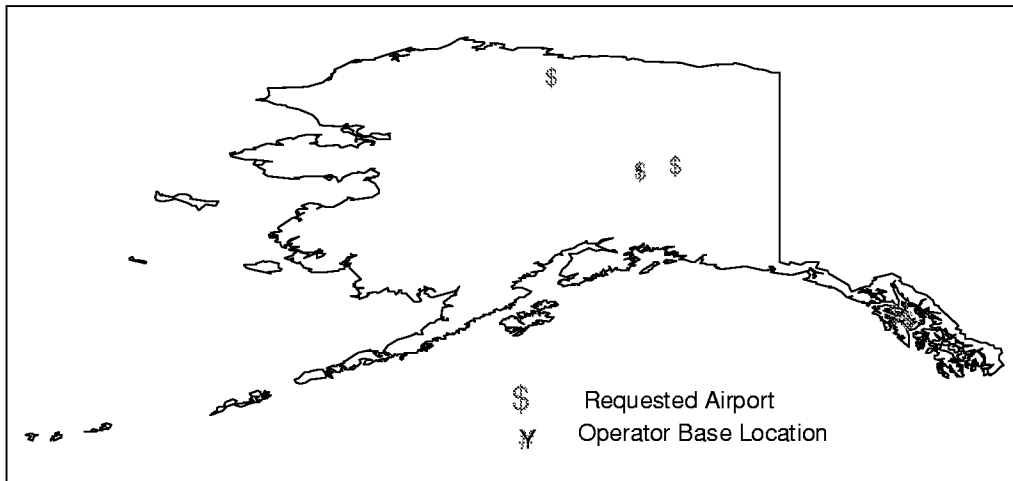


Figure 5 - Participating Operators Requested Airports - Alaska



The needed airports that were listed by the operators participating in the survey constitute only a small fraction of the possible airports that may be needed by all Part 135 operators. However this small sample of information does show tendencies of Part 135 operators needs. For example, a large percentage of operators in the southwest and upper mid-west appear to have more of a need for weather reporting capabilities as opposed to operators in the southeast. Figure 6 and 7 show the group of requested airports in the upper Midwest and the Southwest and their proximity to airports with weather reporting capabilities.

Figure 6 - Requested Airports Proximity to Weather Reporting Airports - Upper Midwest

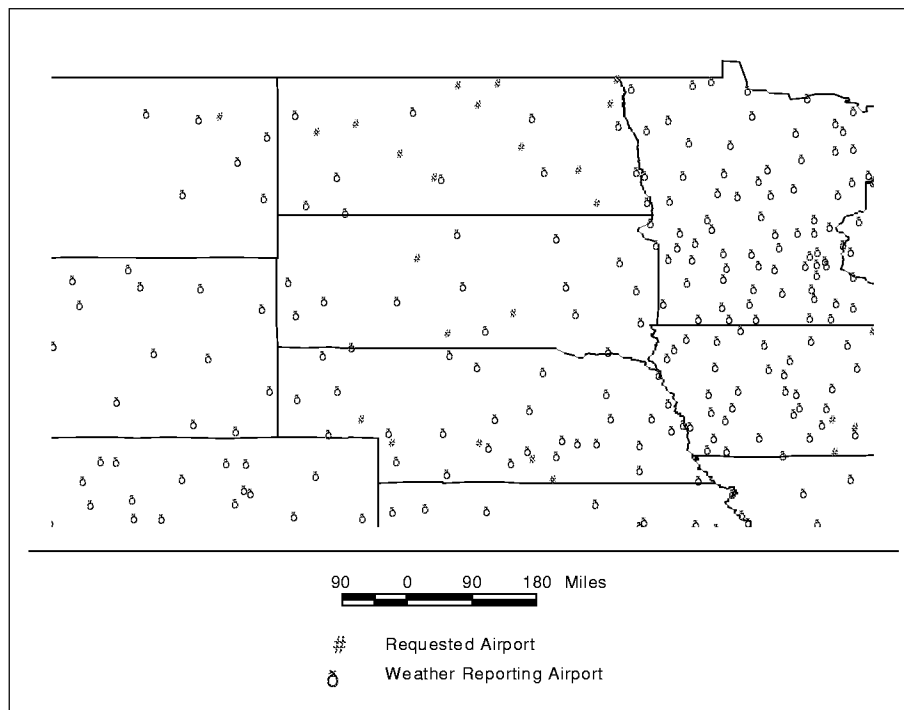
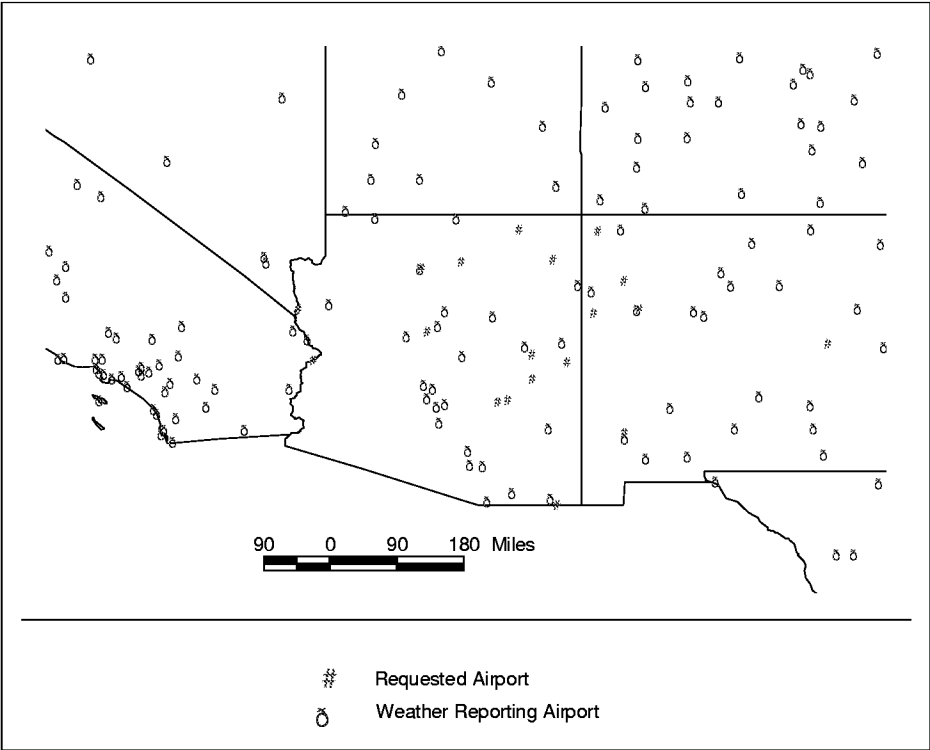
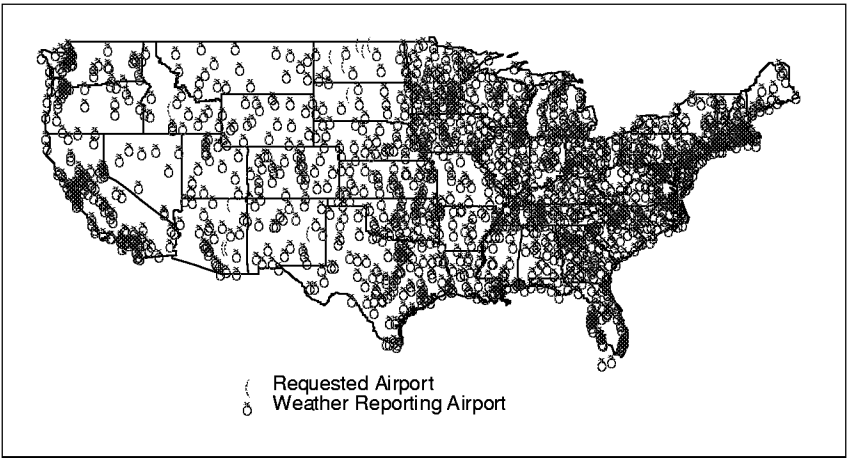


Figure 7 - Requested Airports Proximity to Weather Reporting Airports – Southwest



Eleven of the requested airports were not within 50 miles of another weather reporting airport as shown in Figure 8.

Figure 8 - Requested Airport with No Alternate Weather Reporting Airport within 50 Miles



Additionally, small operators with single and multi-engine equipment as well as EMS/air ambulance have a greater need for weather reporting at more airports than the operators that use the larger jet aircraft. This point is illustrated in Figure 4. The requested airports are grouped within a 200 to 300 mile radius of the operators' home base. The operators operating in those grouped areas primarily used single, multi-engine and helicopter aircraft. At the other end of the operator spectrum are the larger Part 135 operators equipped with jets. One Part 135 operator that volunteered to participate in the survey immediately returned the questionnaire unanswered stating that they have mostly larger jets and do not fly to any airports that do not have instrument approaches or weather reporting capabilities. Based on these comments and what has been depicted in the previous figures, the need for operators to file to destinations, which do not have an official weather reporting capability, is determined largely by the type of equipment operated.

The most beneficial information from the needs assessment survey was the suggestions and subsequent responses to the FARs dealing with weather reporting requirements. Most Part 135 operators feel that if Part 91 operators are allowed to make instrument approaches to non-weather reporting airports, then Part 135 operators should also be allowed to make the approach, given that the pilot experience level is usually as high or higher than Part 91 operators. The predominate suggestion to changes in Section 135.225 involved the use of more automated weather stations and the use of an alternate airports that provide weather information. The suggestions for an alternate weather-reporting airport ranged from 6 miles to 85 miles from the destination airport. Another topic that was discussed widely was the topic of runway visual range (RVR). The following suggestion was made in the first questionnaire:

“In general RVR updated on a 3 to 5 minute basis on an ASOS is far more useful than prevailing visibility”

Responses to this suggestion were varied as indicated below:

“I disagree. The problems involved in additional equipment such as RVR is the small town budget. I believe the current ASOS is fine and should not be changed but should be made more available at discounted rates.

“This is true where the airport has the ability to report RVR values. The majority of the airports that have ASOS only report prevailing visibility. If every ASOS installation were equipped with RVR it would greatly [improve] a pilots understanding of current conditions.”

“Considering that airports affected by this regulatory change will predominately have non-precision approaches, prevailing visibility will have more significance than RVR reports.”

“ASOS reliability is questionable. To rely solely on an RVR figure where the error of 100 feet will make the difference is dumb. I would rather get a visibility from the machine that

allows for a larger range of RVR to determine the prevailing visibility. It is less likely that I will have to miss [the approach].”

“I think both are helpful. Smaller airports may have a greater proportion of circle to land approaches. RVR is great on the runway but may not cover maneuvering around the airfield.”

On some issues, such as RVR, it is evident that there will not be a consensus. This is due to the diversity of Part 135 operators - the equipment used, their geographic location and the nature of their customers.

4.0 Analysis

This analysis will concentrate on the concept that Part 135 operators need access to airports that do not have, or are not scheduled to have, official weather reporting capabilities. Further, this analysis assumes that the aviation community generally agrees that there is merit in allowing the use of alternate weather reporting airports as a means of complying with FAR Section 135.225. The merit is evident through the statements expressed many times in the needs assessment survey, through NATA’s limited exemption requests to the FAA, and through the current Fractional Ownership NPRM. The needs assessment survey also brought out the perception that small, shorter haul aircraft (single, twin and helicopter) operators seem to have more of a need for filing to airports without weather reporting capabilities. Larger, long haul operators appear not to have as great a need because the destinations they typically fly to have weather reporting, instrument approaches, and necessary runway lengths. However, the needs assessment survey cannot be relied on (due to the small sample size used in the survey) as an accurate source for determining which operators have the greatest need, the number of airports possibly needed by Part 135 operators, or the locations of possible airports. Based on the above concepts, this analysis will look at potential airports that could be used by Part 135 operators by using runway length, automated weather reporting capabilities, instrument approach capabilities, and distance to alternate airports as the primary criteria for selecting potential Part 135 IFR airports.

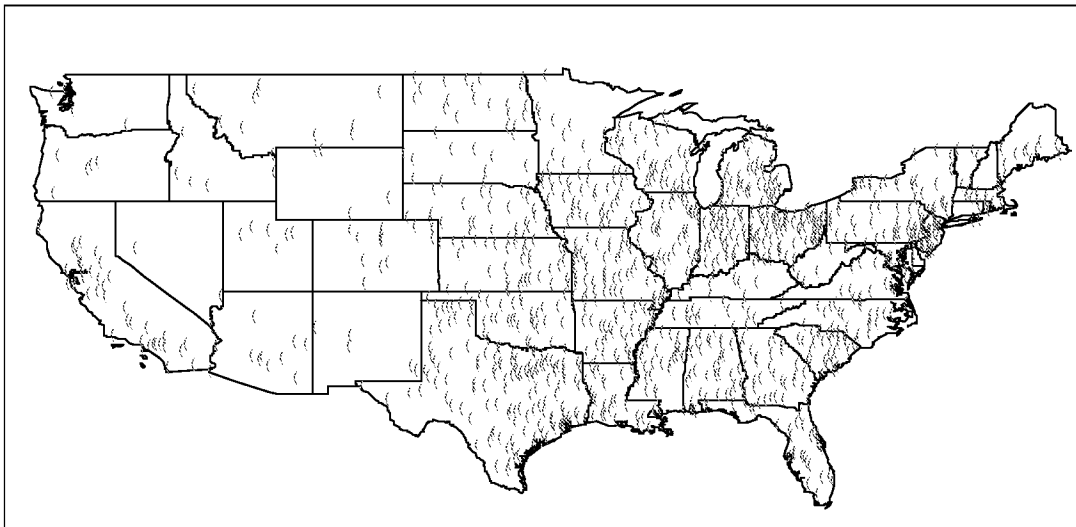
There are approximately 19,750 airports, heliports, and seaports listed by the FAA in the Landing Facilities Database⁸. Obviously not all these landing facilities can be used or are needed by Part 135 operators. To determine how many landing facilities Part 135 operators might need, assumptions had to be established. One assumption is that the AWOS and ASOS automated weather reporting stations determine whether the airport is considered “weather reporting”. As mentioned in Section 2.3.1, automated weather reporting provides, or supplements, more than 90% of ground surface weather information. The second assumption is that a Part 135 IFR airport must currently have, or potentially accommodate in the future, at least a non-precision instrument approach. The Airport Design Handbook, AC 150/5300-13 shows that for a

⁸ FAA Landing Facilities Database (APT-FILE) , Information Effective date - September 6, 2001,

nonprecision approach with the highest minimum visibility of 1 mile, the runway must be at least 2,400 feet. The third assumption is the landing facility must have a concrete, asphalt, gravel or turf runway. While concrete and asphalt runways were expected runway types at airports, gravel runways are common in Alaska and several surveyed Part 135 operators requested turf runways airports. For this reason gravel and turf runways were included in the criteria of possible Part 135 airports. Using these assumptions the number of potentially useful Part 135 landing facilities was reduced to approximately 8,048, (Alaska – 78, CONUS – 7,970). Of the 8,048 selected landing facilities, 6,542 did not have any type of automated weather reporting capability (Alaska –24, CONUS- 6,518). The airports that currently have instrument approaches will be looked at first.

Of the 6,542 airports without weather reporting, 1,109 airports have an instrument approach. Alaska does not have any approaches where there is not a weather reporting capability on airports that have at least a 2,400-foot runway. Figure 9 shows the airports that have instrument approaches but do not have weather reporting capabilities. It is apparent from the map in Figure 9 that certain areas of the country have significantly fewer airports with weather reporting capabilities. This was one of the complaints of the survey respondents.

Figure 9 - Airports With Airports Runways > 2400 Feet That Are Paved, Gravel or Turf And Have Instrument Approaches But No Weather Reporting Capabilities - Total 1,109 Airports



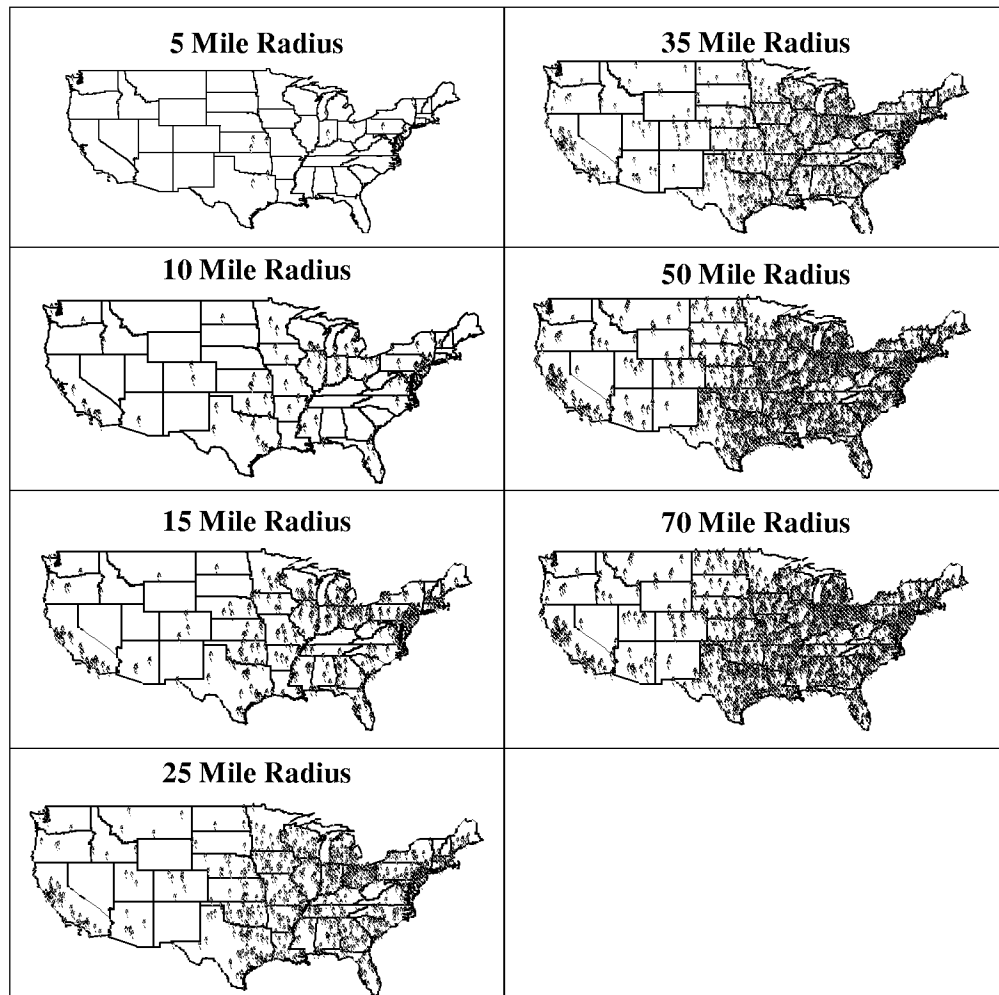
If FARs were changed to allow alternate airports with weather reporting within a specific distance, additional airports would become available to Part 135 operators for IFR operations. The number of additional airports, potentially useable to Part 135 operators, would increase as the mileage from the destination airport to an alternate weather reporting airport increases. At a 70-mile radius, all 1,109 airports that have instrument approaches, but no weather reporting capabilities, would be potentially useable to Part 135 operators for IFR operations. Table 2 and

Figure 10 below show the results of changing the FARS to allow alternate airports with weather reporting.

**Table 2 - Number of Additional Airports by Miles From Weather Reporting Airports
(Destination Airports Currently Have Instrument Approaches)**

Miles Between Destination Airport And Weather Reporting Airport	Additional Airports
5	14
10	114
15	315
25	761
35	979
50	1,081
70	1,109

**Figure 10 -Number of Additional Airports by Miles From Weather Reporting Airports
(Destination Airports Currently Have Instrument Approaches)**



A similar analysis can be accomplished on the 5,433 airports that do not currently have an instrument approach or weather reporting capabilities, but could have an instrument approach in the future. As the numbers in Table 3 indicate, all 5,433 airports that do not currently have instrument approaches and do not have weather reporting capabilities could become potential airports if the regulations changed to allow operators to use alternate weather reporting airports. While a distance of 110 miles from an alternate airport would not be considered safe, a more reasonable distance of 25 miles adds more than half of the existing airports.

**Table 3 - Number of Additional Airports by Miles From Weather Reporting Airports
(Destination Airports Currently Do Not Have Instrument Approaches)**

Miles Between Destination Airport And Weather Reporting Airport	Additional Airports
5	192
10	953
15	2,005
25	3,728
35	4,640
50	5,206
70	5,397
110	5,433

5.0 Conclusion

The needs assessment survey provided insight into the operations of Part 135 operators. Statistically, operators did not have a high percentage of operations to airports without weather reporting capabilities. However, operators did have very strong opinions about weather related regulations, particularly the regulations that require airports to have weather reporting capabilities. Based on their input concerning weather-reporting requirements, one would assume that operators have a definite need to fly to airports without weather reporting capabilities. Assuming this to be the case, operators in the more remote areas of the country are in a much greater need for weather reporting capabilities. As one operator stated, "North Dakota followed by Montana and South Dakota are the worst states for having approved weather services at "usable" airports. Limited to as little as 11 sites in North Dakota alone, given it's size, approved weather in most cases or at least for all 135 ops is limited to 5NM radius of the airport. That leaves a large portion of our normal operating area uncovered and inaccessible in IMC conditions. Montana and South Dakota are also thin when it comes to IMC 135 usable airports." The lack of weather reporting is a detriment to on-demand operators and, even more importantly, to EMS operators.

Technology has been a big factor in opening up airports across the country. AWOS and ASOS stations continue to play a vital role in providing surface weather information. AWOS station costs are gradually declining, now costing between \$70K and \$90K. States such as Texas have initiated programs requiring large orders of automated weather stations. GPS technology will also open up new airports for IFR operations. As GPS approaches are developed, including WAAS/LAAS approaches, operators will be able to file IFR to these airports. The main constraint to adding new approaches will be the costs involved for required runways, taxiways, lighting, obstruction clearance, environmental studies and community acceptance. Finally, technology will play a vital role by providing current reliable weather information into the cockpit. Using ASOS and AWOS data link capabilities, weather information can be transmitted to the cockpit and graphically displayed making the weather information more useful and understandable to the pilot.

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Appendix A – Current FAR Sections 135.213, 135.219 and 135.225

Section 135.213 – Weather reports and Forecasts

(a) Whenever a person operating an aircraft under this part is required to use a weather report or forecast, that person shall use that of the U.S. National Weather Service, a source approved by the U.S. National Weather Service, or a source approved by the Administrator. However, for operations under VFR, the pilot in command may, if such a report is not available, use weather information based on that pilot's own observations or on those of other persons competent to supply appropriate observations.

(b) For the purposes of paragraph (a) of this section, weather observations made and furnished to pilots to conduct IFR operations at an airport must be taken at the airport where those IFR operations are conducted, unless the Administrator issues operations specifications allowing the use of weather observations taken at a location not at the airport where the IFR operations are conducted. The Administrator issues such operations specifications when, after investigation by the U.S. National Weather Service and the certificate-holding district office, it is found that the standards of safety for that operation would allow the deviation from this paragraph for a particular operation for which an air carrier operating certificate or operating certificate has been issued.

Section 135.219 – IFR: Destination airport weather minimums.

No person may take off an aircraft under IFR or begin an IFR or over-the-top operation unless the latest weather reports or forecasts, or any combination of them, indicate that weather conditions at the estimated time of arrival at the next airport of intended landing will be at or above authorized IFR landing minimum.

Section 135.225 IFR: Takeoff, approach and landing minimums.

(a) No pilot may begin an instrument approach procedure to an airport unless--

(1) That airport has a weather reporting facility operated by the U.S. National Weather Service, a source approved by U.S. National Weather Service, or a source approved by the Administrator; and

(2) The latest weather report issued by that weather reporting facility indicates that weather conditions are at or above the authorized IFR landing minimums for that airport.

(b) No pilot may begin the final approach segment of an instrument approach procedure to an airport unless the latest weather reported by the facility described in paragraph (a)(1) of this section indicates that weather conditions are at or above the authorized IFR landing minimums for that procedure.

(c) If a pilot has begun the final approach segment of an instrument approach to an airport under paragraph (b) of this section and a later weather report indicating below minimum conditions is received after the aircraft is--

- (1) On an ILS final approach and has passed the final approach fix; or
- (2) On an ASR or PAR final approach and has been turned over to the final approach controller; or
- (3) On a final approach using a VOR, NDB, or comparable approach procedure; and the aircraft--
 - (i) Has passed the appropriate facility or final approach fix; or
 - (ii) Where a final approach fix is not specified, has completed the procedure turn and is established inbound toward the airport on the final approach course within the distance prescribed in the procedure; the approach may be continued and a landing made if the pilot finds, upon reaching the authorized MDA or DH, that actual weather conditions are at least equal to the minimums prescribed for the procedure.
- (d) The MDA or DH and visibility landing minimums prescribed in Part 97 of this chapter or in the operator's operations specifications are increased by 100 feet and 1/2 mile respectively, but not to exceed the ceiling and visibility minimums for that airport when used as an alternate airport, for each pilot in command of a turbine-powered airplane who has not served at least 100 hours as pilot in command in that type of airplane.
- (e) Each pilot making an IFR takeoff or approach and landing at a military or foreign airport shall comply with applicable instrument approach procedures and weather minimums prescribed by the authority having jurisdiction over that airport. In addition, no pilot may, at that airport--
 - (1) Take off under IFR when the visibility is less than 1 mile; or
 - (2) Make an instrument approach when the visibility is less than 1/2 mile.
- (f) If takeoff minimums are specified in Part 97 of this chapter for the takeoff airport, no pilot may take off an aircraft under IFR when the weather conditions reported by the facility described in paragraph (a)(1) of this section are less than the takeoff minimums specified for the takeoff airport in Part 97 or in the certificate holder's operations specifications.
- (g) Except as provided in paragraph (h) of this section, if takeoff minimums are not prescribed in Part 97 of this chapter for the takeoff airport, no pilot may take off an aircraft under IFR when the weather conditions reported by the facility described in paragraph (a)(1) of this section are less than that prescribed in Part 91 of this chapter or in the certificate holder's operations specifications.
- (h) At airports where straight-in instrument approach procedures are authorized, a pilot may take off an aircraft under IFR when the weather conditions reported by the facility described in paragraph (a)(1) of this section are equal to or better than the lowest straight-in landing minimums, unless otherwise restricted, if--
 - (1) The wind direction and velocity at the time of takeoff are such that a straight-in instrument approach can be made to the runway served by the instrument approach;
 - (2) The associated ground facilities upon which the landing minimums are predicated and the related airborne equipment are in normal operation; and
 - (3) The certificate holder has been approved for such operations.

Appendix B – NPRM 10047 - Proposed FAR Section 135.225

(Italics indicate proposed changes)

(a) Except to the extent permitted by paragraph (b) of this section, no pilot may begin an instrument approach procedure to an airport unless –

(1) That airport has a weather reporting facility operated by the U.S.

National Weather Service, a source approved by U.S. National Weather Service, or a source approved by the Administrator; and

(2) The latest weather report issued by that weather reporting facility indicates that weather conditions are at or above the authorized IFR landing minimums for that airport.

(b) A pilot employed by an eligible on-demand operator may begin an instrument approach procedure to an airport if –

(1) Either that airport or the alternate airport has a weather reporting facility operated by the U.S. National Weather Service, a source approved by the U.S. National Weather Service, or a source approved by the Administrator; and

(2) The latest weather report issued by the weather reporting facility includes a current local altimeter setting for the destination airport. If no local altimeter setting for the destination airport is available, the pilot may use the current altimeter setting provided by the facility designated on the approach chart for the destination airport.

(3) For flight planning purposes, if the destination airport does not have a weather reporting facility described in paragraph (b)(1) of this section, the pilot must designate as an alternate an airport that has a weather reporting facility meeting that criteria.

(c) No pilot may begin the final approach segment of an instrument approach procedure to an airport unless the latest weather reported by the facility described in paragraph (a)(1) of this section indicates that weather conditions are at or above the authorized IFR landing minimums for that procedure.

(d) If a pilot has begun the final approach segment of an instrument approach to an airport under paragraph (c) of this section and a later weather report indicating below minimum conditions is received after the aircraft is--

(1) On an ILS final approach and has passed the final approach fix; or

(2) On an ASR or PAR final approach and has been turned over to the final approach controller; or

(3) On a final approach using a VOR, NDB, or comparable approach procedure; and the aircraft--

(i) Has passed the appropriate facility or final approach fix; or

(ii) Where a final approach fix is not specified, has completed the procedure turn and is established inbound toward the airport on the final approach course within the distance prescribed in the procedure; the approach may be continued and a landing made if the pilot finds, upon reaching the authorized MDA or DH, that actual weather conditions are at least equal to the minimums prescribed for the procedure.

(e) The MDA or DH and visibility landing minimums prescribed in Part 97 of this chapter or in the operator's operations specifications are increased by 100 feet and 1/2 mile respectively, but not to exceed the ceiling and visibility minimums for that airport when used as an alternate

airport, for each pilot in command of a turbine-powered airplane who has not served at least 100 hours as pilot in command in that type of airplane.

(f) Each pilot making an IFR takeoff or approach and landing at a military or foreign airport shall comply with applicable instrument approach procedures and weather minimums prescribed by the authority having jurisdiction over that airport. In addition, no pilot may, at that airport--

(1) Take off under IFR when the visibility is less than 1 mile; or

(2) Make an instrument approach when the visibility is less than 1/2 mile.

(g) If takeoff minimums are specified in Part 97 of this chapter for the takeoff airport, no pilot may take off an aircraft under IFR when the weather conditions reported by the facility described in paragraph (a)(1) of this section are less than the takeoff minimums specified for the takeoff airport in Part 97 or in the certificate holder's operations specifications.

(h) Except as provided in paragraph (i) of this section, if takeoff minimums are not prescribed in Part 97 of this chapter for the takeoff airport, no pilot may take off an aircraft under IFR when the weather conditions reported by the facility described in paragraph (a)(1) of this section are less than that prescribed in Part 91 of this chapter or in the certificate holder's operations specifications.

(i) At airports where straight-in instrument approach procedures are authorized, a pilot may take off an aircraft under IFR when the weather conditions reported by the facility described in paragraph (a)(1) of this section are equal to or better than the lowest straight-in landing minimums, unless otherwise restricted, if--

(1) The wind direction and velocity at the time of takeoff are such that a straight-in instrument approach can be made to the runway served by the instrument approach;

(2) The associated ground facilities upon which the landing minimums are predicated and the related airborne equipment are in normal operation; and

(3) The certificate holder has been approved for such operations.

Appendix C – Part 135 Survey - First Questionnaire

Part 135 Operator Survey

Thank you for taking time to participate in this Part 135 Operator study. The questions in this questionnaire are focused on your need to fly to airports that do not have official weather reporting capabilities.

Instructions: There are 14 questions below that should not take longer than 20 minutes to complete. You can respond to this questionnaire by using three different methods. Choose the easiest method for you.

Method 1 – Use your email application’s “Reply” feature and enter your responses to the right of the “#” symbol. For example, the reply to question 1 might look like

1# b c d

Method 2 – You can send a new email and reference your responses by the question number. My email address is cliff.eckert@gtri.gatech.edu

Method 3 – Print this email, write your answers on the paper then fax the completed questionnaire to (770) 528-7177. A cover sheet is not necessary but please write your name and company name at the top.

Please complete the questionnaire and reply by November 2, 2001

THE INFORMATION YOU PROVIDE IS CONSIDERED STRICTLY CONFIDENTIAL.

1. List the categories of aircraft that you fly under your Part 135 certificate:
A. Single Piston B. Twin Piston C. Turboprop D. Jet E. Helicopter

1#

2. What is the average trip distance (in miles) from your base of operation for your typical Part 135 flight? (A range of distances is OK)

2#

3. Approximately, how many trips per month are to airports that have official weather reporting capabilities? (A trip is defined as one takeoff and one landing.)

3#

4. Approximately, how many VFR trips per month are actually flown to airports that do not have official weather reporting capabilities?

4#

5. Approximately, how many flights per month are requested, but denied due to IFR conditions, to airports that do not have official weather reporting capabilities?

5#

6. Has your operation ever received an FAA exemption to FAR Section 135.225 to fly into an airport that does not have official weather reporting capabilities? If so, please describe the exemption requirements.

6#

7. Generally, what is the nature of the flights that are requested to non-weather reporting airports? (For example: business, medical, government business, cargo, etc.)

7#

8. If FAR Section 135.225 is modified as proposed under NPRM (FAA-2001-10047), how will this impact your 135 operation?-

A. No impact B. Will help some C. Will allow us to fly to all airports needed
D. Not sure.

For information on the NPRM visit

<http://dms.dot.gov/search/document.asp?qdocumentid=134672&qdocketid=10047>

8#

Comments 8#

9. List the airports that you regularly fly VFR to, or have been regularly requested to fly to, that do not have official weather reporting capabilities but do have published IFR approaches. List either the airport name or airport designator and try to list in order of most needed to least needed.

9#

10. Of the airports that you listed in question 9, which airports would you be able to file IFR to if the regulations were modified as stated in the NPRM?

10#

11. List the airports that you regularly fly VFR to, or have been regularly requested to fly to, that do not have official weather reporting capabilities and do not have published instrument approaches. List either the airport name or airport designator and try to list in order of most needed to least needed.

11#

12. What modifications or changes would you suggest to FAA Part 135 sections 135.213, 135.219, or 135.225 that would allow you to operate into an airport without weather reporting capabilities, while maintaining or improving the current level of safety?

For information on the FAR Part 135.213

[http://www.airweb.faa.gov/Regulatory and Guidance Library/rgFAR.nsf/CurrentFARPart/42969A5E2A4EEF868625694A006FB822?OpenDocument](http://www.airweb.faa.gov/Regulatory%20and%20Guidance%20Library/rgFAR.nsf/CurrentFARPart/42969A5E2A4EEF868625694A006FB822?OpenDocument)

Part 135.219

[http://www.airweb.faa.gov/Regulatory and Guidance Library/rgFAR.nsf/CurrentFARPart/356D10A8E564CC478625694A006FBDBC?OpenDocument](http://www.airweb.faa.gov/Regulatory%20and%20Guidance%20Library/rgFAR.nsf/CurrentFARPart/356D10A8E564CC478625694A006FBDBC?OpenDocument)

Part 135.225

[http://www.airweb.faa.gov/Regulatory and Guidance Library/rgFAR.nsf/CurrentFARPart/9FEE576B754871908625694A006FC34A?OpenDocument](http://www.airweb.faa.gov/Regulatory%20and%20Guidance%20Library/rgFAR.nsf/CurrentFARPart/9FEE576B754871908625694A006FC34A?OpenDocument)

12#

13. What type of weather reporting capabilities would you recommend for IFR operations into airports that do not have weather reporting capabilities?

13#

14. Please feel free to make any additional comments regarding weather-reporting requirement issues.

14# Additional comments#

This completes the first questionnaire. In approximately two weeks you will receive a second follow-up questionnaire. Thanks for your time.

Appendix D – Part 135 Survey - Second Questionnaire

Part 135 Operator Survey – Second Questionnaire

First let me say how much we appreciate your taking time to help with this study. Hopefully this study will have an impact on the work that is being done by NASA and the FAA and, more importantly, will benefit Part 135 operators across the country. Thanks so much and have a happy and safe Thanksgiving.

This is the follow-up questionnaire based on the responses we received from the first questionnaire. This questionnaire only has 3 questions and should only take about 15 minutes (but it will require a little more thought!).

Instructions: Please choose the easiest method for you to reply to this questionnaire.

Method 1 – Use your email application’s “Reply” feature and enter your responses to the right of the “#” symbol. For example, the reply to question 1 might look like

1# b c d

Method 2 – You can send a new email and reference your responses by the question number. My email address is cliff.eckert@gtri.gatech.edu

Method 3 – Print this email, write your answers on the paper then fax the completed questionnaire to (770) 528-7177. A cover sheet is not necessary but please write your name and company name at the top.

Please try to complete the questionnaire and reply by November 26, 2001.

THE INFORMATION YOU PROVIDE IS CONSIDERED STRICTLY CONFIDENTIAL.

15. Please list the airport(s) for your base of operations: (name or airport designator)

1#

16. The NPRM that has been released by the FAA would allow “eligible on-demand charter operators” to file IFR to airports that do not have official weather reporting capabilities. About half of the operators from the first questionnaire indicated that this proposed rule would have “no impact” or “will help some”.

Please comment on how the proposed changes would or would not impact the needs of your operation.

2#

3. Below are some of the comments/suggestions we received from the first questionnaire concerning operator's needs to fly into airports without weather reporting capabilities. Please read each comment and then, in a few sentences, comment on any or all of the suggestion's strengths and weaknesses, refine the suggestions, and if possible, provide new suggestions.

"In general RVR updated on a 3 to 5 minute basis on an ASOS is far more useful than prevailing visibility".

"If RVR reports that the airport is below landing minimums, an approach should not be started. This is a good rule. The only issue I have is that pilots should be able to fly an approach if no weather reporting is available if a suitable alternate with weather reporting is available and if the pilot/crew was reasonably experienced in the aircraft. No low time pilots or inexperienced crew should be allowed to do this."

"Have a suitable alternate with weather reporting within 30 minutes flying time in still air with both engines operating."

“ASOS seems the obvious answer, failing that, altimeter and visibility. The other weather data could be taken from the observations at nearby stations...”

“I believe if a properly experienced pilot, based a your airport of intended landing, was to issue a report of " 3 miles" and ceiling “estimated at 1000 to 1500 feet” based on his experience, should be an approved or acceptable source of initial weather for that airport. Then based on all other data received by the pilot in a thorough preflight briefing from an approved source, the pilot can determine whether or not the flight can be accomplished safely.”

“As long as there are airports within a 25 mile radius of the intended landing that has an approved weather source”

“Ok to fly approach with official weather as long as aircraft does not fly below approach minimums without airport in sight. If local altimeter not available, then raise minimum altitude by 300 feet.”

This completes the second questionnaire. Have a good day!

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13. ABSTRACT (Maximum 200 words) NASA and the FAA have joint interests and responsibilities for developing guidelines and standards for cockpit displays of Flight Information Services (FIS) information and for developing enhancements to the planned FAA Data Link (FISDL) services. NASA and the FAA have established responsibilities in connection with development tasks for enhancements to the FISDL project. This report is the result of NASA Task 2, “Weather Support Concept-Part 135 Operations.” The objective of the task was to determine the needs of Part 135 operators as they relate to FAA Part 135 Sections 135.213, 135.219 and 135.225, which pertain to weather reporting requirements at destination airports. This report discusses the results of two questionnaires completed by volunteer Part 135 operators that questioned their operations, their needs for flying to airports without weather reporting compatibilities, and suggestions for modifying FARs 135.213, 135.219 and 135.225. The operators pointed out airports in areas of the CONUS that were needed for IFR operations but lacked weather reporting capabilities and they offered practical suggestions for changes to the FARs. Related to operators’ needs, and discussed in this report, were the Fractional Ownership NPRM and the possible impact of GPS WAAS and LAAS approaches.				
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